

Amendments to the Claims:

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

1. **(Currently Amended)** In a data-storage system having a data storage unit that includes at least two constituent data storage elements, each of said constituent data storage elements being in one of a first state and a second state other than said first state, a method comprising:

providing a data structure having an entry corresponding to said data storage unit, said entry including status information indicating whether at least one constituent data storage element of said data storage unit is in said first state;  
[[and]]

locking said data structure before modifying said status information;

updating said entry following a change in state of at least one of said constituent data storage elements[[-]], wherein updating said entry comprises:

identifying an entry in said data structure corresponding to a data storage unit that includes a constituent data storage element in said first state; and

modifying status information in said entry to indicate that said data storage unit includes at least one constituent data storage element in said first state; and

unlocking said data structure after modifying said status information.

**2 - 12. (Cancelled)**

**13. (Currently Amended)** A computer-readable medium having software for execution in a data-storage system having a data storage unit that includes at least two constituent data storage elements, each of said constituent data storage elements being in one of a first state and a second state other than said first state, said software comprising instructions for:

providing a data structure having an entry corresponding to said data storage unit, said entry including status information indicating whether at least one constituent data storage element of said data storage unit is in said first state;  
[[and]]

locking said data structure before modifying status information;

updating said entry following a change in state of at least one of said constituent data storage elements[[:-]] wherein said instructions for updating said entry comprise instructions for:

identifying an entry in said data structure corresponding to a data storage unit that includes a constituent data storage element in said first state;

modifying status information in said entry to indicate that said data storage unit includes at least one constituent data storage element in said first state; and

unlocking said data structure after modifying status information

**14 - 24. (Cancelled)**

**25. (Currently Amended)** A data-storage system comprising:

a data storage unit that includes at least two constituent data storage elements,  
each of said constituent data storage elements being in one of a first state and  
a second state other than said first state wherein said data storage unit  
comprises a cylinder and said constituent data storage elements comprise  
tracks included in said cylinder;

a memory element configured to hold a data structure having an entry  
corresponding to said data storage unit, said entry including status information  
indicating whether at least one constituent data storage element of said data  
storage unit is in said first state,

wherein said data structure comprises a bit map having a plurality of bits, each of  
which corresponds to a cylinder, each bit having a first state indicating that at  
least one track in said cylinder includes invalid data and a second state  
indicating that no tracks in said cylinder include invalid data.

**26. (Original)** The data-storage system of claim **25**, further comprising a lock for locking  
said data structure to prevent modification of said status information.

**27. (Cancelled)**

**28. (Original)** The data-storage system of claim **[[27]] 25**, wherein said first state indicates  
the presence of invalid data on said track.

**29. (Cancelled)**

**30. (New)** In a data-storage system having a data storage unit that includes at least two  
constituent data storage elements, each of said constituent data storage elements being in  
one of a first state and a second state other than said first state, a method comprising:

providing a data structure having an entry corresponding to said data storage unit,  
said entry including status information indicating whether at least one constituent  
data storage element of said data storage unit is in said first state; and

updating said entry following a change in state of at least one of said constituent data  
storage elements

wherein updating said entry comprises:

identifying an entry in said data structure corresponding to a data storage unit that  
includes a constituent data storage element in said first state; and

modifying status information in said entry to indicate that said data storage unit  
includes at least one constituent data storage element in said first state;

wherein modifying status information comprises inspecting said status information to  
determine if said status information already indicates that at least one constituent  
data storage element is in said first state.

**31. (New)** The method of claim **30**, further comprising locking said data structure before  
modifying status information and unlocking said data structure after modifying status  
information.

**32. (New)** The method of claim **30**, wherein updating said entry comprises:

detecting that a constituent data storage element is in said second state;

determining whether said data storage unit contains any constituent data storage  
element in said first state;

identifying an entry in said data structure corresponding to a data storage unit  
that includes said constituent data storage element;

modifying status information in said entry to indicate that no constituent data storage elements of said data storage unit are in said first state.

33. (New) The method of claim 32, further comprising locking said data structure before modifying status information and unlocking said data structure after modifying status information.
34. (New) The method of claim 32, wherein modifying status information comprises inspecting said status information to determine if said status information already indicates that all constituent data storage elements are in said second state.
35. (New) The method of claim 30, further comprising selecting said data storage unit to be a cylinder and selecting said constituent data storage elements to be tracks included in said cylinder.
36. (New) The method of claim 35, further comprising selecting said first state to indicate the presence of invalid data on said track.
37. (New) The method of claim 35, wherein providing a data structure comprises providing a bit map having a plurality of bits, each of which corresponds to a cylinder, each bit having a first state indicating that at least one track in said cylinder includes invalid data and a second state indicating that no tracks in said cylinder include invalid data.
38. (New) The method of claim 30, further comprising scanning said data structure to locate constituent data storage elements in said first state.
39. (New) The method of claim 38, wherein scanning said data structure comprises:

detecting an entry in said data structure that indicates the presence, in said data storage unit associated with said data structure, of at least one constituent data storage element in said first state; and

scanning constituent data storage elements included in said data storage unit to identify said constituent data storage element in said first state.

- 40. (New)** In a data-storage system having a data storage unit that includes at least two constituent data storage elements, each of said constituent data storage elements being in one of a first state and a second state other than said first state, a method comprising:

providing a data structure having an entry corresponding to said data storage unit, said entry including status information indicating whether at least one constituent data storage element of said data storage unit is in said first state; and

locking said data structure before modifying status information;

updating said entry following a change in state of at least one of said constituent data storage elements; wherein updating said entry comprises:

detecting that a constituent data storage element is in said second state;

determining whether said data storage unit contains any constituent data storage element in said first state;

identifying an entry in said data structure corresponding to a data storage unit that includes said constituent data storage element;

modifying status information in said entry to indicate that no constituent data storage elements of said data storage unit are in said first state; and

unlocking said data structure after modifying said status information

- 41. (New)** In a data-storage system having a data storage unit that includes at least two constituent data storage elements, each of said constituent data storage elements being in one of a first state and a second state other than said first state, a method comprising:

providing a data structure having an entry corresponding to said data storage unit,  
said entry including status information indicating whether at least one constituent  
data storage element of said data storage unit is in said first state; and

updating said entry following a change in state of at least one of said constituent data  
storage elements; wherein updating said entry comprises:

detecting that a constituent data storage element is in said second state;

determining whether said data storage unit contains any constituent data storage  
element in said first state;

identifying an entry in said data structure corresponding to a data storage unit that  
includes said constituent data storage element; and

modifying status information in said entry to indicate that no constituent data  
storage elements of said data storage unit are in said first state;

wherein modifying status information comprises inspecting said status information to  
determine if said status information already indicates that all constituent data  
storage elements are in said second state.

**42. (New)** The method of claim **41**, wherein updating said entry comprises:

identifying an entry in said data structure corresponding to a data storage unit  
that includes a constituent data storage element in said first state;

modifying status information in said entry to indicate that said data storage unit  
includes at least one constituent data storage element in said first state.

**43. (New)** The method of claim **42**, further comprising locking said data structure before

modifying status information and unlocking said data structure after modifying status information.

- 44.** (New) The method of claim **42**, wherein modifying status information comprises inspecting said status information to determine if said status information already indicates that at least one constituent data storage element is in said first state.
- 45.** (New) The method of claim **41**, further comprising locking said data structure before modifying status information and unlocking said data structure after modifying status information.
- 46.** (New) The method of claim **41**, further comprising selecting said data storage unit to be a cylinder and selecting said constituent data storage elements to be tracks included in said cylinder.
- 47.** (New) The method of claim **46**, further comprising selecting said first state to indicate the presence of invalid data on said track.
- 48.** (New) The method of claim **46**, wherein providing a data structure comprises providing a bit map having a plurality of bits, each of which corresponds to a cylinder, each bit having a first state indicating that at least one track in said cylinder includes invalid data and a second state indicating that no tracks in said cylinder include invalid data.
- 49.** (New) The method of claim **41**, further comprising scanning said data structure to locate constituent data storage elements in said first state.



**50. (New)** The method of claim **49**, wherein scanning said data structure comprises:

detecting an entry in said data structure that indicates the presence, in said data storage unit associated with said data structure, of at least one constituent data storage element in said first state; and

scanning constituent data storage elements included in said data storage unit to identify said constituent data storage element in said first state.

**51. (New)** In a data-storage system having a data storage unit that includes at least two constituent data storage elements, each of said constituent data storage elements being in one of a first state and a second state other than said first state, a method comprising:

providing a data structure having an entry corresponding to said data storage unit, said entry including status information indicating whether at least one constituent data storage element of said data storage unit is in said first state;

updating said entry following a change in state of at least one of said constituent data storage elements;

selecting said data storage unit to be a cylinder and selecting said constituent data storage elements to be tracks included in said cylinder

wherein providing a data structure comprises providing a bit map having a plurality of bits, each of which corresponds to a cylinder, each bit having a first state indicating that at least one track in said cylinder includes invalid data and a second state indicating that no tracks in said cylinder include invalid data.

**52. (New)** A computer-readable medium having software for execution in a data-storage system having a data storage unit that includes at least two constituent data storage

elements, each of said constituent data storage elements being in one of a first state and a second state other than said first state, said software comprising instructions for:

providing a data structure having an entry corresponding to said data storage unit,  
said entry including status information indicating whether at least one constituent data storage element of said data storage unit is in said first state; and

updating said entry following a change in state of at least one of said constituent data storage elements wherein said instructions for updating said entry comprise instructions for:

identifying an entry in said data structure corresponding to a data storage unit that includes a constituent data storage element in said first state; and

modifying status information in said entry to indicate that said data storage unit includes at least one constituent data storage element in said first state;

wherein said instructions for modifying status information comprise instructions for inspecting said status information to determine if said status information already indicates that at least one constituent data storage element is in said first state.

**53. (New)** The computer-readable medium of claim **52**, wherein said software further comprises instructions for locking said data structure before modifying status information and unlocking said data structure after modifying status information.

**54. (New)** The computer-readable medium of claim **52**, wherein said instructions for updating said entry comprise instructions for:

detecting that a constituent data storage element is in said second state;

determining whether said data storage unit contains any constituent data storage element in said first state;

identifying an entry in said data structure corresponding to a data storage unit that includes said constituent data storage element;

modifying status information in said entry to indicate that no constituent data storage elements of said data storage unit are in said first state.

- 55.** (New) The computer-readable medium of claim **54**, wherein said software further comprises instructions for locking said data structure before modifying status information and unlocking said data structure after modifying status information.
- 56.** (New) The computer-readable medium of claim **54**, wherein said instructions for modifying status information comprise instructions for inspecting said status information to determine if said status information already indicates that all constituent data storage elements are in said second state.
- 57.** (New) The computer-readable medium of claim **52**, wherein said software further comprises instructions for selecting said data storage unit to be a cylinder and selecting said constituent data storage elements to be tracks included in said cylinder.
- 58.** (New) The computer-readable medium of claim **57**, wherein said software further comprises instructions for selecting said first state to indicate the presence of invalid data on said track.
- 59.** (New) The computer-readable medium of claim **57**, wherein said instructions for providing a data structure comprise instructions for providing a bit map having a plurality of bits, each of which corresponds to a cylinder, each bit having a first state indicating that at least one track in said cylinder includes invalid data and a second state indicating that no tracks in said cylinder include invalid data.
- 60.** (New) The computer-readable medium of claim **52**, wherein said software further comprises instructions for scanning said data structure to locate constituent data storage

elements in said first state.

- 61. (New)** The computer-readable medium of claim **52**, wherein said instructions for scanning said data structure comprise instructions for:

detecting an entry in said data structure that indicates the presence, in said data storage unit associated with said data structure, of at least one constituent data storage element in said first state; and

scanning constituent data storage elements included in said data storage unit to identify said constituent data storage element in said first state.

- 62. (New)** A computer-readable medium having software for execution in a data-storage system having a data storage unit that includes at least two constituent data storage elements, each of said constituent data storage elements being in one of a first state and a second state other than said first state, said software comprising instructions for:

providing a data structure having an entry corresponding to said data storage unit, said entry including status information indicating whether at least one constituent data storage element of said data storage unit is in said first state;

locking said data structure before modifying status information and unlocking said data structure after modifying status information; and

updating said entry following a change in state of at least one of said constituent data storage elements; wherein said instructions for updating said entry comprise instructions for:

detecting that a constituent data storage element is in said second state;

determining whether said data storage unit contains any constituent data storage element in said first state;

identifying an entry in said data structure corresponding to a data storage unit that includes said constituent data storage element; and

modifying status information in said entry to indicate that no constituent data storage elements of said data storage unit are in said first state.

- 63. (New)** A computer-readable medium having software for execution in a data-storage system having a data storage unit that includes at least two constituent data storage elements, each of said constituent data storage elements being in one of a first state and a second state other than said first state, said software comprising instructions for:

providing a data structure having an entry corresponding to said data storage unit, said entry including status information indicating whether at least one constituent data storage element of said data storage unit is in said first state; and

updating said entry following a change in state of at least one of said constituent data storage elements

wherein said instructions for updating said entry comprise instructions for:

detecting that a constituent data storage element is in said second state;

determining whether said data storage unit contains any constituent data storage element in said first state;

identifying an entry in said data structure corresponding to a data storage unit that includes said constituent data storage element; and

modifying status information in said entry to indicate that no constituent data storage elements of said data storage unit are in said first state; and

wherein said instructions for modifying status information comprise instructions for inspecting said status information to determine if said status information already indicates that all constituent data storage elements are in said second state.

- 64.** (New) The computer-readable medium of claim **63**, wherein said instructions for updating said entry comprise instructions for:
- identifying an entry in said data structure corresponding to a data storage unit that includes a constituent data storage element in said first state;
  - modifying status information in said entry to indicate that said data storage unit includes at least one constituent data storage element in said first state.
- 65.** (New) The computer-readable medium of claim **64**, wherein said software further comprises instructions for locking said data structure before modifying status information and unlocking said data structure after modifying status information.
- 66.** (New) The computer-readable medium of claim **64**, wherein said instructions for modifying status information comprise instructions for inspecting said status information to determine if said status information already indicates that at least one constituent data storage element is in said first state.
- 67.** (New) The computer-readable medium of claim **63**, wherein said software further comprises instructions for locking said data structure before modifying status information and unlocking said data structure after modifying status information.
- 68.** (New) The computer-readable medium of claim **63**, wherein said software further comprises instructions for selecting said data storage unit to be a cylinder and selecting said constituent data storage elements to be tracks included in said cylinder.
- 69.** (New) The computer-readable medium of claim **68**, wherein said software further comprises instructions for selecting said first state to indicate the presence of invalid data

on said track.

- 70. (New)** The computer-readable medium of claim **68**, wherein said instructions for providing a data structure comprise instructions for providing a bit map having a plurality of bits, each of which corresponds to a cylinder, each bit having a first state indicating that at least one track in said cylinder includes invalid data and a second state indicating that no tracks in said cylinder include invalid data.
- 71. (New)** The computer-readable medium of claim **63**, wherein said software further comprises instructions for scanning said data structure to locate constituent data storage elements in said first state.
- 72. (New)** A computer-readable medium having software for execution in a data-storage system having a data storage unit that includes at least two constituent data storage elements, each of said constituent data storage elements being in one of a first state and a second state other than said first state, said software comprising instructions for:
- providing a data structure having an entry corresponding to said data storage unit, said entry including status information indicating whether at least one constituent data storage element of said data storage unit is in said first state;
  - updating said entry following a change in state of at least one of said constituent data storage elements;
  - selecting said data storage unit to be a cylinder and selecting said constituent data storage elements to be tracks included in said cylinder
- wherein said instructions for providing a data structure comprise instructions for providing a bit map having a plurality of bits, each of which corresponds to a cylinder, each bit having a first state indicating that at least one track in said

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cylinder includes invalid data and a second state indicating that no tracks in said  
cylinder include invalid data.